

Appl. No. 10/044,271

Amdt. Dated Jun. 23, 2005

Reply to Office Action of Mar. 23, 2005

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (currently amended): A method for making a thin film filter having a negative temperature drift coefficient ~~comprises~~, comprising the steps of:

providing a film stack material;

providing a substrate wafer which has a coefficient of thermal expansion greater than that of the film stack material;

polishing the substrate wafer;

depositing thin film layers made of the film stack material on the substrate wafer at a temperature substantially higher than room temperature, thereby creating a film stack on the substrate wafer;

cooling the substrate wafer-film stack laminate to room temperature; and

cutting the cooled substrate wafer-film stack laminate into pieces,

wherein the coefficient of thermal expansion of the substrate wafer is within the range from  $10 \times 10^{-6}/^{\circ}\text{K}$  to  $20 \times 10^{-6}/^{\circ}\text{K}$ .

Claim 2 (canceled)

Claim 3 (original): The method as described in claim 1, wherein the substrate wafer is transparent to electromagnetic waves having a wavelength in a range between 1561 nm and 1620 nm.

Claim 4 (currently amended): The method as described in claim ~~[[2]]~~ 1,

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wherein the substrate is made of a  $\text{SiO}_2\text{-Na}_2\text{O-K}_2\text{O-Li}_2\text{O-PbO-XO}_2$  system, wherein X can be titanium (Ti) or zirconium (Zr).

Claim 5 (currently amended): The method as described in claim [[2]] 1, wherein the substrate is made of a  $\text{SiO}_2\text{-Na}_2\text{O-K}_2\text{O-Li}_2\text{O-PbO-}[[Y]]\text{Q}_2\text{O}_3$  system wherein [[Y]] Q can be aluminum (Al).

Claim 6 (currently amended): The method as described in claim [[2]] 1, wherein the substrate is made of a  $\text{SiO}_2\text{-Na}_2\text{O-K}_2\text{O-Li}_2\text{O-P}_2\text{O}_5\text{-ZO}_2$  system, wherein Z can be titanium (Ti) or zirconium (Zr).

Claim 7 (currently amended): The method as described in claim [[2]] 1, wherein the substrate wafer is doped with at least one of a group comprising lead (Pb), lithium (Li), sodium (Na) and potassium (K).

Claim 8 (currently amended): The method as described in claim 1, wherein the a deposition surface of the substrate wafer has an average roughness in the range of between 0.1 nm and 0.8 nm.

Claim 9 (currently amended): The method as described in claim [[2]] 1, wherein the materials making the film stack are tantalum oxide and ~~silica~~ silicon dioxide.

Claim 10 (original): The method as described in claim 1, wherein the film stack endures a substantially compressive stress at room temperature.

Claims 11-15 (canceled)

Claim 16 (withdrawn): A structure of a film filter comprising a plurality of film layers made of a film stack material and a substrate wafer which said film layers are deposited on at a temperature substantially higher than a room temperature and is retained to after being cooled to the room temperature, wherein said substrate wafer owns a coefficient of thermal expansion greater than that of

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the film stack material so as to generate compressive forces upon the associated film layers, thus resulting in a negative temperature drift coefficient of said film filter.

Claim 17 (withdrawn): A structure of a film filter comprising a plurality of film layers made of a film stack material and a substrate wafer which said film layers are deposited on and retained to; wherein said substrate wafer owns a coefficient of thermal expansion greater than that of the film stack material, and from a microscopic viewpoint both said substrate wafer and said film layers commonly define a convex configuration under a condition that said substrate wafer is located closer to a center of said convex configuration than said filter layers.

Claim 18 (withdrawn): A structure of a film filter comprising a plurality of film layers made of a film stack material and a substrate wafer which said film layers are deposited on and retained to, said substrate wafer owning a coefficient of thermal expansion greater than that of the film stack material and resulting in a negative temperature drift coefficient of the film filter in comparison with a positive temperature drift coefficient of a conventional film filter, said film filter being characterized in that:

within a range between a higher temperature and a lower temperature with therebetween a room temperature corresponding to a normal bandwidth, said film filter at said lower temperature results in thereof a narrowed bandwidth with a reduced value smaller than another reduced value of another narrowed bandwidth resulting from said conventional film filter at said higher temperature, and said film filter at said higher temperature results in thereof a broadened bandwidth with thereof an increased value smaller than another increased value of another broadened bandwidth resulting from said conventional film filter at said lower

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temperature.